

COSTON'S TELEGRAPHIC NIGHT SIGNALS, ETC.

LETTER

FROM

THE SECRETARY OF THE NAVY,

IN ANSWER TO

A resolution of the House calling for information relating to "Coston's telegraphic night signals," "and governors for marine steam-engines."

JANUARY 14, 1861.—Referred to the Committee on Naval Affairs, and ordered to be printed.

NAVY DEPARTMENT, *January 12, 1861.*

SIR: I have the honor to acknowledge the receipt of the resolution of the House of Representatives of the 9th instant, requesting the Secretary of the Navy "to communicate to the House any papers or other information in his possession in relation to the Coston telegraphic night signals, and also to advise the House what, if any, experiments he has made in the matter of governors for marine steam-engines; what, if any such, governor he would recommend for the use of the navy; and what expense, in his opinion, would be saved to the government by the use of the governor upon our steamships and propellers."

In compliance with so much of the resolution as relates to governors for marine steam-engines, I transmit herewith copies of the reports upon the merits of the respective governors for marine engines which have been brought recently to the attention of the department, viz: Rice's, Silver's, and Sergeant's. I also transmit copy of a report of the engineer-in-chief of the navy on the subject. The department concurs with him in his views as to the superiority of Sergeant's governor, so far as can be determined from the reports and experiments that have been made, and would recommend it for use in the navy, but is unable to say what expense would be saved to the government by its use on our steamships and propellers.

The information in relation to Coston's signals will be transmitted with a future report from the department.

I am, very respectfully, your obedient servant,

I. TOUCEY.

HON. WM. PENNINGTON,
Speaker of the House of Representatives.

*Rice's marine governor.*NAVY DEPARTMENT, *December 20, 1858.*

GENTLEMEN: Mr. John Rice has called the attention of the department to a marine governor with power attachment for regulating the speed of marine engines at sea, and requested that a board of engineers may be ordered to examine it.

You are hereby appointed a board for the purpose, and after examining the governor and witnessing its operation, you will report to the department your opinion, in writing, of its merits, in comparison with others with which you are acquainted.

The machine is believed to be in operation at the establishment of Messrs. Reaney, Neafie & Co., Philadelphia.

I am, respectfully, your obedient servant,

ISAAC TOUCEY.

Chief Engineer JOHN P. WHIPPLE, and First Assistant Engineers
GEO. GIDEON and EDWIN FITHIAN, *U. S. Navy, Philadelphia.*

PHILADELPHIA, *January 5, 1859.*

SIR: In obedience to your order of December 20, 1858, we have carefully examined a working model of "Mr. John Rice's governor, with power attachment for regulating the speed of marine engines at sea," and respectfully submit the following report:

The excessive strains to which marine engines are subjected by the sudden emerging and submerging of the propeller are productive of great wear and tear, and it is therefore a great desideratum to obtain a governor calculated to obviate these strains; this we believe will be accomplished by the instrument submitted by Mr. Rice.

The great feature in this invention is the positive power attachment, by which the engine itself is made to perform nearly all the work in controlling the admission of steam to the cylinder, which materially reduces the size of the governor without affecting its efficiency.

The advantages of this governor may be stated as follows:

- 1st. Simple in its construction and operation.
- 2d. Prompt enough in its action to check the speed of the engines before they gain a dangerous ascendancy.
- 3d. Decisive and unerring in its action.
- 4th. Small liability to derangement.

A comparison of this governor with others with which we are acquainted leads us to believe that it possesses in the power attachment an unquestionable superiority for marine purposes. We beg further to state that a full-sized governor is now being constructed,

embodying improvements which will, we believe, render the instrument still more efficient than the one we have examined.

We have the honor to be, very respectfully, your obedient servants,

JOHN P. WHIPPLE,

Chief Engineer, U. S. Navy.

GEO. GIDEON,

First Assistant Engineer, U. S. Navy.

EDWIN FITHIAN,

First Assistant Engineer, U. S. Navy.

Hon. ISAAC TOUCEY,

Secretary of the Navy.

Silver's marine governor.

NAVY DEPARTMENT, *January 31, 1859.*

SIR: A board, to consist of yourself, Chief Engineer Stewart, and First Assistant Engineer Fithian, is hereby appointed and directed to examine and witness the performance of "Silver's marine governor," and then to report to the department in full their opinion of its individual and comparative merits.

The marine governor will be exhibited by Thomas Silver, esq., 248 Chestnut street, Philadelphia.

I am, respectfully, your obedient servant,

ISAAC TOUCEY.

Chief Engineer JOHN P. WHIPPLE,

United States Navy, Philadelphia.

PHILADELPHIA, *February 14, 1859.*

SIR: In obedience to your order of January 31, we have examined and witnessed the operation of Mr. Thomas Silver's marine governor, as applied to an engine now in operation at the United States mint, in this city, and respectfully report:

That on the occasion of our visit to the mint the engine was employed in driving two sets of rolls for drawing silver and copper, and was consequently subjected to sudden variations of duty, ranging from fifteen to forty-horse power. These sudden changes enabled us to satisfy ourselves of the action of the instrument, which we found to be so prompt and sensitive in its action that no appreciable difference could be observed in the speed of the engine.

But the great object which Mr. Silver had in view in devising this governor was to neutralize the action of gravity, which affects all governors when the centre of gravity of the balls falls below the point of support. This he has accomplished in such a manner that the point of support coincides with the centre of gravity of the balls, and the governor will therefore act promptly, no matter in what posi-

tion it may be placed, and it is consequently perfectly adapted for use on board marine steamers.

As we have not had an opportunity of witnessing the operation of a marine governor at sea, we called upon Captain West, who formerly commanded the Collins' steamer Atlantic, on which vessel one of the governors was attached. He informed us that he considered it a most valuable appendage to a marine steam-engine, and that its operation was perfectly satisfactory, under all circumstances, and more particularly while scudding, when the engine performed with great regularity, and the value of the instrument was then made plainly evident, all racing being effectually prevented.

Mr. Silver has also exhibited a model of a governor constructed upon a different principle. "In this form the inertia or regulating nature of a momentum wheel is used by having the shaft (which turns loosely in the centre of the momentum wheel) geared in the ordinary manner to the engine, so that should the shaft be turned at a speed differing from that which the momentum wheel has attained, a differential movement is given to the sliding sleeve, as in the ordinary governor, exerting an immediate action on the throttle valve with a power commensurate with the sudden start of the engine.

"The momentum wheel is impelled in advance of the shaft by the force of a spiral spring to a degree sufficient to hold the throttle valve open whilst the engine is running steady; but the speed of the wheel is also limited by vanes, which are attached to it for atmospheric resistance. These vanes can be set at any angle to suit the desired speed, so also can the springs be compressed or liberated, which forms a second means of regulating speed."

The action as shown by the model is very prompt and decisive, and at the same time extremely sensitive. This plan has been adopted in several instances with great success on board English screw ships, as shown by original letters from the owners submitted to our inspection, but it has never been applied in this country. We enclose herewith a drawing showing both plans.

As we are acquainted with but one other form of marine governor, (that of Mr. John Rice,) and as that has not yet had a practical test, a comparison cannot be made fairly without such test, which we regard is the only method of arriving at a correct knowledge of their relative merits.

After a very careful investigation, we are of opinion that either form of this instrument as shown in the drawing will operate in a satisfactory manner on marine engines, and we therefore respectfully recommend it to the department for a practical trial.

We have the honor to be, very respectfully, your obedient servants,

JOHN P. WHIPLE,

HENRY H. STEWART,

Chief Engineers, United States Navy.

EDWIN FITHIAN,

First Assistant Engineer, United States Navy.

Hon. ISAAC TOUCEY,

Secretary of the Navy.

UNITED STATES STEAMER LANCASTER,
Norfolk, Virginia, June 20, 1859.

SIR: I have the honor, in obedience to your order, herewith to enclose an abstract log of the performance under steam of this ship, during her recent trial trip from Philadelphia to this port.

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The Silver's marine governor proved inoperative during the trip, under the supervision of the agent of the inventor, who was on board at the request of the latter.

Respectfully, your obedient servant,

WM. W. W. WOOD,
Chief Engineer, United States Navy.

Flag Officer J. B. MONTGOMERY,
Commanding Pacific Squadron, Flag Ship Lancaster.

UNITED STATES STEAMER LANCASTER,
Valparaiso, Chili, November 14, 1859.

SIR: In obedience to your order, I have respectfully to state that the engines, boilers, and their dependencies on board this ship are in an efficient condition; and after our frequent and occasional hard steaming from the United States, and especially since leaving Rio de Janeiro, I consider them in better working order, if such were possible, than at any previous time. No defects have been discovered, or any part of the machinery given way; and their performance has continued satisfactory in every respect.

The appendage of the "Silver's marine governor" has been fairly tested, and while it partially throttled the engines when racing badly, its application failed to produce in them a constant, regular, and uniform motion.

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I am, respectfully, your obedient servant,

WM. W. W. WOOD,
Chief Engineer.

Captain JOHN RUDD,
U. S. Navy, Comd'g U. S. Steamer Lancaster.

Sergeant's marine governor.

NAVY DEPARTMENT, *February 19, 1859.*

SIR: A board, to consist of yourself and Chief Engineers Whipple and Stewart, is hereby appointed and directed to examine and witness the performance of "Sergeant's new steam regulator." The trial will be made at the navy yard, Washington, and Chief Engineers Whipple and Stewart have been ordered to report to the commandant of that yard.

The board will report to the department their opinion of the individual and comparative merits of "Sergeant's regulator."

I am, respectfully, your obedient servant,

ISAAC TOUCEY.

Chief Engineer HENRY HUNT,
United States Navy, Washington.

NAVY YARD, WASHINGTON,
February 26, 1859.

SIR: In compliance with your order of the 19th instant, we have examined the performance of "Sergeant's marine regulator," by attaching it to an engine in this yard and carefully noting its operation.

It is a governor, or an instrument for regulating the speed of engines by admitting more or less steam at the required moments; but unlike all other instruments which have been contrived for that purpose, does not depend upon the centrifugal force or gravity of revolving balls.

The peculiarity of Mr. Sergeant's regulator, and wherein its chief efficiency consists, is the using of two revolving metallic discs, with inclined or wedge-shaped surfaces, so arranged that the least vibration in the velocity of either opens or shuts the throttle valve. These discs revolve in the same direction and in contact with each other, but by independent motions; the one by a small oscillating cylinder, and the other by a belt from the shaft of the main engine.

When the engine is working at a regular speed both discs revolve with the same velocity; but should a sudden load or a greater resistance be suddenly thrown on the engine, the speed of the disc driven by the belt will be checked for an instant, but it will be as instantaneously driven out on the inclined plane against the throttle valve stem, thereby opening the throttle valve in the least possible measure of time. So, also, when the load is suddenly taken off the engine, the discs instantly assume the relative position necessary to maintain the regular speed.

It was tried on the saw-mill engine, where we had the chance of suddenly throwing on and off the load of two saw gates; and so quick was the governor in its operation that there was no perceptible check or increase in the speed of the engine, which is a condition we have never been able to obtain from the best ball governor ever used in this yard. Theoretically considered, the change is much quicker than can possibly be obtained by a ball governor. Suppose the engine regulated to make 40 revolutions per minute, and the two discs, which are 18 inches in circumference, revolve 100 times per minute. Suppose a load suddenly thrown upon the engine which would have reduced the revolutions to 20 per minute; the velocity of the disk driven by the belt is instantly reduced one-half. But we only require a change of one inch in the relative position of the two discs to open the throttle valve, and as both discs had been revolving 1,800 inches per minute, and one suddenly reduced to 900 inches per minute, there is for an instant a difference of 900 inches per minute in their relative veloci-

ties, which is equal to 15 inches per second ; but as we only required a movement of one inch, the valve is therefore opened far enough in one fifteenth part of a second. In practice we found it so quick that no check could be perceived by the eye.

So certain was the governor in its operation that the engine could be worked at any desired speed—even *very slow*—which required the throttle valve to be nearly closed when the load was suddenly thrown on and off without any perceptible difference. Under the same circumstances, with a ball governor, the engine would have stopped on the centre.

An engine supplied with Mr. Sergeant's governor can be easily and quickly regulated to any desired speed by simply opening or shutting a small valve which admits steam to the oscillating cylinder. For an engine of 1,000-horse power, a valve not over three-quarters of an inch or one inch in diameter would be sufficient, and can be opened or shut with the thumb and finger as easily as shutting off a gas-light. Indeed, so sensitive is the instrument, that the main engine can be stopped instantly by closing this small valve.

The governor operates on a balance-valve which admits steam to the main engine, and the same valve is also conveniently arranged as a steam stop-valve, being detached from the governor.

It can be applied to any engine where any other governor can, and we think it better adapted for marine engines than any other with which we are acquainted.

We have the honor to be, &c.,

HENRY HUNT,
J. P. WHIPPLE,
HENRY H. STEWART,
Chief Engineers, U. S. Navy.

Hon. ISAAC TOUCEY,
Secretary of the Navy.

NAVY DEPARTMENT, *March 17, 1860.*

SIR: The department desires to obtain accurate information in relation to the merits of "Sergeant's marine governor," which has been applied to the engines of the "Pocahontas." On some suitable occasion for developing its qualities—during a gale if possible—you will, in conjunction with the senior engineer of the "Pocahontas," carefully observe the operations of the governor, and report the result to the department, with your opinion of its merits.

I am, respectfully, your obedient servant,

ISAAC TOUCEY.

Commander S. F. HAZARD,
Com'g U. S. S. "Pocahontas," Norfolk.

UNITED STATES STEAMER "POCAHONTAS,"
New Orleans, May 22, 1860.

SIR: In compliance with your order of March 17, to inform the department in relation to the merits of "Sergeant's marine governor,"

as attached to the engines of this ship, we respectfully report that we have carefully observed its operation during a heavy head sea, and feel satisfied as to its successful performance.

At different times during a moderately heavy dead sea, which caused the engines to race considerably, the governor has been applied, and the result most satisfactory, the engines being under perfect control, and working as regularly as though we were steaming in smooth water. In our opinion it is a capital arrangement, and we have no hesitation in recommending its application to all marine engines.

We have the honor to be, very respectfully, &c.,

S. F. HAZARD,

Commander.

E. W. MANNING,

First Ass't Engineer U. S. S. "Pocahontas"

Hon. ISAAC TOUCEY,

Secretary of the Navy.

OFFICE OF ENGINEER-IN-CHIEF, UNITED STATES NAVY,
Washington, January 11, 1861.

SIR: In compliance with your indorsement on the resolution of the House of Representatives, relating to governors for marine steam-engines, it is respectfully stated that experiments have been made by order of the department with those of Mr. Rice's and Mr. Silver's patents at Philadelphia, and also with that of Mr. Sergeant's in the Washington navy yard.

Mr. Silver's governor has since been applied to the engines of the United States first class steam sloop-of-war "Lancaster," the flagship of the Pacific squadron, and Sergeant's governor has been applied to the engines of the second class steamer "Pocahontas," of the home squadron.

The report from the engineer of the "Lancaster" is altogether unfavorable to the "Silver's governor," and the report of the commander and acting chief engineer of the "Pocahontas" is, that the "Sergeant's governor" performed with great satisfaction.

In my opinion, an efficient instrument for this purpose is very desirable in screw steamers, and as far as the experiments of the government has shown, or has fallen under my observation, by a careful study of the subject, that of Mr. Sergeant's is the most perfect now in use.

With respect to the expense that would be saved to the government by the use of an efficient marine steam governor, it would be difficult to give any estimate, but the steam machinery of a ship-of-war of the first class, costing about eighty thousand dollars, is, without an instrument of this kind, exposed, in a heavy seaway, to have her machinery crippled, if not rendered totally useless.

I am, respectfully, your obedient servant,

SAMUEL ARCHBOLD,

Engineer in-chief, United States Navy.

Hon. ISAAC TOUCEY,

Secretary of the Navy.